


**The Solubility of  $\text{UO}_2^{2+}$  in Dilute Sodium Chloride Solutions  
and in High-Ionic-Strength Sodium Sulfate and Chloride  
Brines**

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Uranium is a major component of high-level nuclear waste. In an oxidizing environment,  $\text{UO}_2^{2+}$  would be expected to be the dominant dissolved species in solution. In addition to dilute solutions, because high-level nuclear waste may be stored in repositories containing salt, it is important to characterize the aqueous chemistry of  $\text{UO}_2^{2+}$  and the solubility-controlling U(VI) solids in high-ionic-strength brines as a function of pH.

We have studied the solubility of  $\text{UO}_2^{2+}$  by precipitation of a solid phase in 0.001 molal NaCl, 5.2 molal NaCl, and saturated  $\text{Na}_2\text{SO}_4$  at pH values ranging from 5 to 12. The solution concentrations were measured by alpha particle liquid scintillation counting. The precipitated solids were characterized by powder x-ray diffraction, electron microscopy, infrared spectroscopy, and x-ray photoelectron spectroscopy.

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